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Indian Standard

METHODS FOR SPLICING OF WIRE ROPES

PART I HAND SPLICING OF WIRE ROPES

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BUREAU OF INDIAN STANDARDS

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

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Indian Standard

METHODS FOR SPLICING OF WIRE ROPES

PART I HAND SPLICING OF WIRE ROPES

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Indian Standard

METHODS FOR SPLICING OF WIRE ROPES

PART I HAND SPLICING OF WIRE ROPES

0. FOREWORD

0.1 This Indian Standard (Part I) was adopted by the Indian Standards Institution on 29 August 1969, after the draft finalized by the Wire Ropes and Wire Products Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Splicing is securing the ends of a rope into its own parts by interweaving the strands in such a way as to maintain the rope diameter and to preserve the rope strength, like forming an eye or loop at the rope end.

0.3 This standard has been prepared to unify the different practices of hand splicing of ropes prevailing in ship building, navigation and for other purposes.

0.4 Part II of this standard will cover wire rope sling legs with ferrule-secured eye terminals.

0.5 While bending the wires during the process of splicing, necessary precautions should be taken to prevent the possibility of the galvanized surface being injured. The ends of the strands should be properly seized.

0.6 In the preparation of this standard considerable assistance has been derived from the following:

DIN 83318-1959 Spleisse für Drahtseile (Splices for the wire ropes).
Deutscher Normenausschuss.

B.S. Handbook No. 4: Lifting tackle. Part 1: 1959 Ropes and fitting.
British Standards Institution.

1. SCOPE

1.1 This standard (Part I) covers different types of hand splicings, methods of hand splicings and tools for splicing.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 2363-1965* shall apply.

3. TYPES AND METHODS OF SPLICING

3.1 Bordeaux Connection Splicing—The method of splicing for Bordeaux connection for six stranded ropes shall be as specified in Appendix A.

3.2 Flemish Eye Splicing—The method for Flemish eye splicing shall be as given in Appendix B.

3.3 Liverpool Splice—The method for Liverpool splicing shall be as specified in Appendix C.

3.4 Long Splice—The method for long splicing shall be as given in Appendix D.

3.5 Plain Eye and Thimble Splice for Multi-stranded Non-rotating Ropes—The method for the plain eye and thimble splices for wire ropes of 17×7 , 18×7 and 34×7 constructions shall be as given in Appendix E.

3.6 Plain Eye and Thimble Splicing for Six Stranded Ropes—The method shall be either of five-tuck splice or four-and-a-half-tuck splice as described in Appendix F.

3.7 Splice for Endless Rope—The methods of splicing for endless rope shall be as given in Appendix G.

3.8 Splice for Grommet—The method for splicing for grommet shall be as given in Appendix H.

4. TOOLS FOR SPLICING

4.1 The tools used for splicing are steel block, core knife, cutting pliers, marline spike, flat spike, spoon spike, nipper, blacksmith's hammer and dagger.

5. INFORMATION TO BE SUPPLIED BY THE PURCHASER

5.1 The purchaser shall provide the following details with the enquiry or the order:

- a) Type of splicing,
- b) Effective length (in case of end fittings and loop), and
- c) Safe working load.

*Glossary of terms relating to wire ropes.

APPENDIX A

(Clause 3.1)

BORDEAUX CONNECTION SPLICE FOR SIX-STRANDED ROPES

A-1. The end of the rope shall be prepared as described in Appendix F. Seizing for securing the rope in grooves shall be passed over the rope and the casting of the Bordeaux connection (see Fig. 1).

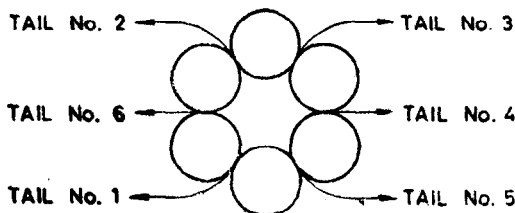
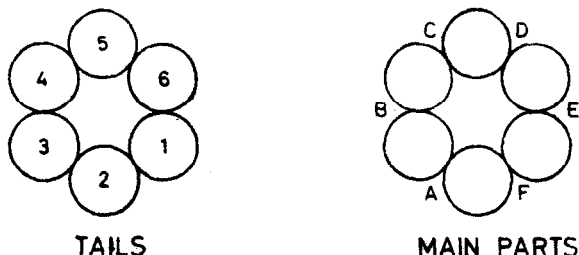


FIG. 1 BORDEAUX CONNECTION SPLICE

A-2. The length of the tails shall be not less than 60 times the diameter.

A-3. A fibre core shall be tucked with tail No. 1, for one tuck only; the core shall be cut off where it emerges from the rope.

A-4. A wire main core shall be split up and the strands or the wires shall be distributed among the tucking tails, and tucked with them for five full tucks, then the core shall be broken off at the completion of the fifth series.

A-5. The different series of tucks shall be as specified below:

First Series			Second Series			Third Series		
Tail No.	In at	Out at	Tail No.	In at	Out at	Tail No.	In at	Out at
1	B	A	*1	B	A	*1	B	A
6	C	B	6	C	B	6	C	B
2	B	C	2	D	C	2	D	C
3	C	D	3	E	D	3	E	D
5	D	E	4	F	E	4	F	E
4	D	F	5	A	F	5	A	F

Fourth Series			Fifth Series			Sixth Series		
Tail No.	In at	Out at	Tail No.	In at	Out at	Tail No.	In at	Out at
*1	B	A	†1	B	C	†1	D	E
6	C	B	6	C	D	6	D	F
2	D	C	2	D	E	2	F	A
3	E	D	3	E	F	3	A	B
4	F	E	4	F	A	4	B	C
5	A	F	5	A	B	5	C	D

Seventh Series			Eighth Series			Ninth Series		
Tail No.	In at	Out at	Tail No.	In at	Out at	Tail No.	In at	Out at
†1	F	A	†1	B	A	†1	B	A
6	A	B	6	C	B	6	C	B
2	B	C	2	D	C	2	D	C
3	C	D	3	E	D	3	E	D
4	D	E	4	F	E	4	F	E
5	E	F	5	A	F	5	A	F

A-6. The ends shall be broken off and slightly hooked so as to give enough holding power to secure them when bent over pulleys. The tucks shall be hammered down and the taper rounded up.

A-7. When protection during handling is required against the wire ends, these may be served over, preferably with spun-yarn.

A-8. Where the rope's length has to be increased so that when the splice taper is unfit for further service, the rope should be cut off and the Bordeaux connection re-spliced.

*The number of wires shall be reduced in each tail by one-third, thus leaving two-thirds of the original number, and the tucks are hammered down. With a rope having a wire main core, the number of core wires shall not be reduced at this stage. This should be included in the fifth series and then broken off.

†The number of wires in each strand shall be reduced to one-third of the original number.

‡Break off wire ends.

APPENDIX B

(Clause 3.2)

FLEMISH EYE SPLICE FOR SIX-STRAND WIRE ROPE RIGHT-HAND ORDINARY LAY

B-1. Flemish Eye Splice — In case of Flemish eye splice, minimum of 12 times the diameter of the rope should be left for splicing. The correct splicing length for the size involved shall be marked with chalk from the end of the rope.

B-2. For a length of 50 mm, the rope shall be tightly tied with a string. The rope at its chalk mark shall then be gripped in a vice in a horizontal position. Each of the six strands of the rope shall be unlaid up to the chalk mark. The cover wires of each strand shall be taken out and twisted in the same direction as the strand while the inner wires shall be cut just near the chalk mark. The main rope core (hemp) shall be split; one of the strands shall be retained and the other two removed by cutting them near the chalk mark.

B-3. Now the six split strands shall be passed through a rope former with six equally spaced holes, and the split main rope core through the central hole of the die plate. The die plate shall then be rotated in the direction of the lay of the rope to give the split strands the form of the rope. The end of the rope shall then be tightly lashed with a string.

B-4. The appropriate thimble shall be fixed at another chalk mark given at a distance equal to 50 mm more than half the distance of the previous chalk mark from the splicing end of the rope. The rope shall be gripped in a vice in a vertical position with the tail end of the rope placed at the left side of the main rope. The strands in the tail end shall be unlaid from the rope one by one up to the 'neck' of the thimble taking care that all the strands are untwisted equally in order that there shall be no crossed strands.

B-5. Now, as in the case of a five tuck splice, each strand should be tucked once and there should be a strand protruding from each groove in the body of the rope.

B-6. All the strands shall be pulled down starting from the lowest strand then proceed with the second tuck by passing each strand over the adjacent rope strand and under the following strand going against the lay of the rope.

B-7. The strands shall be pulled down and repeated to complete the third tuck. All the strands shall be pulled down. Starting from the lowest strand, each strand should be tucked over the adjacent rope strand and then

under and over the same rope strand (round and round) with the lay of the rope to the right till the strands cover the required length.

B-8. The splicing shall be now finished and should be gently hammered from the throat forward, the rope being continuously rotated during this process so that the splice gets hammered all round. This will bring out any slackness in the splice.

B-9. Finally, the splice shall be served with wire.

A P P E N D I X C

(Clause 3.3)

LIVERPOOL SPLICING

C-1. This type of splicing shall be done similar to plain eye splicing (*see* Appendix D). In this, tucks shall be laid around the lay of the rope. This consists of keeping on twisting each of the loose strands in turn around one of the neighbouring strands of the stranding part of the rope.

C-2. The Liverpool splice shall never be used in a rope which is free to spin as the tucks are not firmly held, and the untwisting at the rope's end may cause these tucks to draw out.

A P P E N D I X D

(Clause 3.4)

METHOD FOR LONG SPLICING

D-1. LENGTH

D-1.1 The length to be taken for splicing shall be not less than 960 times the diameter of the rope.

D-2. METHOD

D-2.1 The two rope ends shall be placed alongside each other at a distance equal to half the intended length of splicing, a temporary binding on each rope end at those points shall be made (*see* Fig. 2).

D-2.2 Each rope end up to the temporary bindings shall be unstranded and each alternate strand shall be cut to within a short distance of the bindings; each rope end shall now have three long strand ends and three short strand ends.

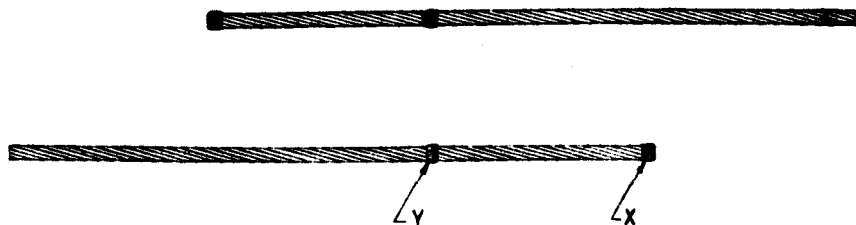


FIG. 2 BINDINGS FOR LONG SPLICE

D-2.3 The two rope ends shall be joined together as shown in Fig. 3 with each strand from one rope end lying between two strands from the opposite rope and with the long strand ends and short strand ends from opposite sides lying adjacent to each other (see Fig. 3). The two fibre core ends shall be protruding from the centre of the rope through the same strand space.

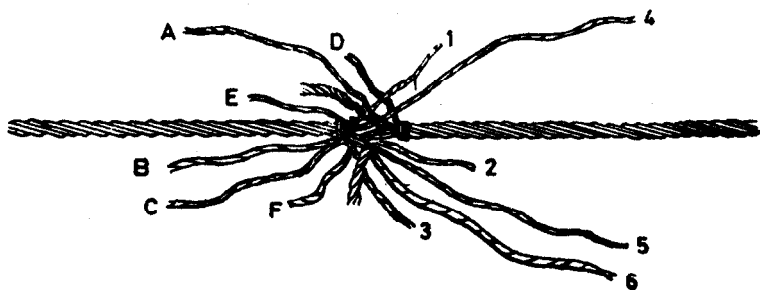


FIG. 3 JOINING FOR LONG SPLICE

D-2.4 The temporary bindings shall be removed and the two rope ends are forced into each other until each falls into the lay of the other. This is important, otherwise, the lay of the rope may be lost at the joint and may spoil the whole splice.

D-2.5 The short strand end 1 shall be taken and unlaid from the rope, at the same time the long strand end A shall be laid into the space vacated. This shall be continued until within a short distance of the end of strand A, that is, until the whole length of A, except the length to be tucked, has been used up.

D-2.6 The same procedure shall be followed with strand ends 2 and B for a distance equal to two-thirds of XY, and again same procedure shall be repeated with strand ends 3 and C for a distance equal to one third of XY.

D-2.7 The same procedure, as described in **D-2.5** and **D-2.6** shall be repeated in the opposite direction along the rope and strand pairs *F* and 6, *D* and 5, *E* and 4, shall be used.

D-2.8 The excess length from the long strands shall be cut off leaving free only the length to be tucked and the rope shall appear as shown in Fig. 3.

D-2.9 Now, each strand pair shall be taken in turn, and the ends shall be uncrossed as shown at strand *A* and 1 (Fig. 4). This shall be done to expose the fibre core and this shall be cut through. The marlin spike shall be used to lift out the core ends.

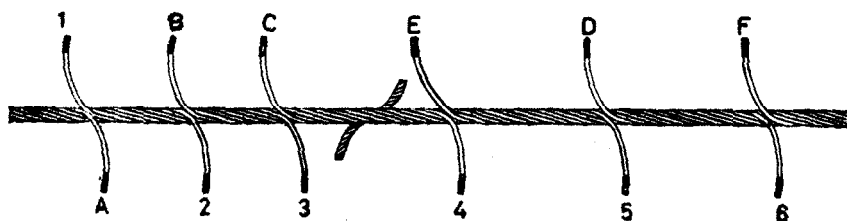


FIG. 4 LONG SPLICE

D-2.10 The strand ends are now ready for tucking or binding, which may be achieved by recrossing the strands after cutting the fibre core and then making the tuck.

D-2.11 The flat spike shall be forced between the two strands through which the tucks are to be made, and the spike shall be passed under two strands. The spoon spike shall be placed on the bottom strand of the two strands, raised by the flat spike, then with the strand end to be tucked between the spikes, the spikes shall be used as levers to force the strand end into the centre of the rope. Now the spoon spike shall be discarded and by rotating the flat spike with the lay of the rope, the tucked end of the rope shall be run along the centre of the rope until it is covered, and finally the core shall be cut so that it butts up to the end of the tuck.

D-2.12 The procedure mentioned in **D-2.11** shall be repeated with the opposite strand end and the tuck shall be completed. The same procedure shall be repeated with each of the remaining strand pairs; finally the two ends of fibre core shall be cut off at the point of 'joint' and the splice completed.

APPENDIX E*(Clause 3.5)***PLAIN EYE AND THIMBLE SPLICING FOR MULTI-STRAND NON-ROTATING ROPES****E-1. NON-ROTATING SPLICE FOR 17×7 CONSTRUCTION**

E-1.1 The end of the rope and its terminals shall be prepared and assembled in a manner similar to that described in Fig. 5.

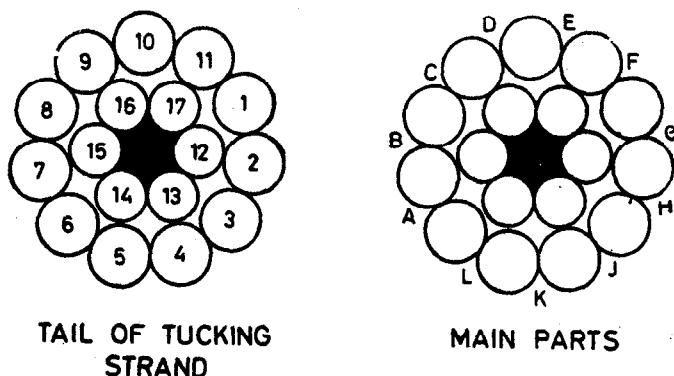


FIG. 5 TAIL AND MAIN WIRE ROPE FOR NON-ROTATING SPLICE OF 17×7 CONSTRUCTION

E-1.2 The tucks shall be made only under the outer strands of the main part of the rope. The inner strands or inner rope shall not be pierced with a spike or disturbed in any way.

E-1.3 The first series of tucks shall be as given below:

Group No.	Tail No.	In at	Out at	Direction
One	3, 4, 14	A	E	Clockwise
Two	1, 2, 13	A	C	Clockwise
Three	5, 6, 15	A	G	Anti-clockwise
Four	7, 8, 16	A	J	Anti-clockwise
Five	9, 10, 17	A	L	Anti-clockwise
Six	11, 12	C	A	Anti-clockwise

E-1.4 For ropes having a wire strand core, the core shall be grouped with tails No. 11 and No. 12, that is, group six.

E-1.5 The second and third series of tucks shall be as given below:

Group No.	Second Series of Tucks		Third Series of Tucks	
	In at	Out at	In at	Out at
One	<i>E</i>	<i>G</i>	<i>J</i>	<i>I</i>
Two	<i>G</i>	<i>J</i>	<i>L</i>	<i>A</i>
Three	<i>J</i>	<i>L</i>	<i>A</i>	<i>C</i>
Four	<i>L</i>	<i>A</i>	<i>C</i>	<i>E</i>
Five	<i>A</i>	<i>C</i>	<i>E</i>	<i>G</i>
Six	<i>C</i>	<i>E</i>	<i>G</i>	<i>J</i>

E-1.6 Fourth and Fifth Series of Tucks — These shall be done on the same principle as before. The splice shall be removed from the vice and partially made splice shall be hammered down, starting from the terminal. One strand from each group shall be removed (excepting 6, if this is only a two-strand group). Again, the splice shall be replaced in the vice.

E-1.7 Sixth and Seventh Series of Tucks — These tucks shall be done on the same principle as before. One strand from each group shall be removed leaving one strand in each group.

E-1.8 Eighth and Ninth Series of Tucks — These series of tucks shall be done on the same principle as before. Splice shall be removed from vice. All the tucks shall be hammered down, starting from the terminal, and the taper shall be rounded off. Surplus ends of the tucking strands shall be broken off and served over the taper or the portion thereof which contains the wire ends.

E-1.9 A tighter splice shall be made when at the first series of tucks the outer strands are tucked first, for example, No. 3 and No. 4, then No. 1 and No. 2, then No. 5 and No. 6, and so on; the inner strands shall be turned separately into the interstice given in the table, that is, No. 14 with No. 3 and No. 4, No. 13 with No. 1 and No. 2, etc. It is usual to splice a Bordeaux connection with 9 tucks as described herein, but for thimbles which are not intended to run over sheaves, 7 tucks are sufficient. In this case, one strand would be removed after the fourth series of tucking and another after the sixth.

E-1.10 When removing strands during the splicing, the cut should be made as close to their emergence as possible. The wires should be broken out separately.

E-1.11 When fitting a thimble, same procedure shall be followed when preparing the rope for a five-tuck splice in six stranded ropes.

E-2. NON-ROTATING SPLICE FOR 18×7 CONSTRUCTION

E-2.1 The splicing for 18×7 construction shall be the same as for 17×7 rope construction, except for the following group arrangements (see Fig 6).

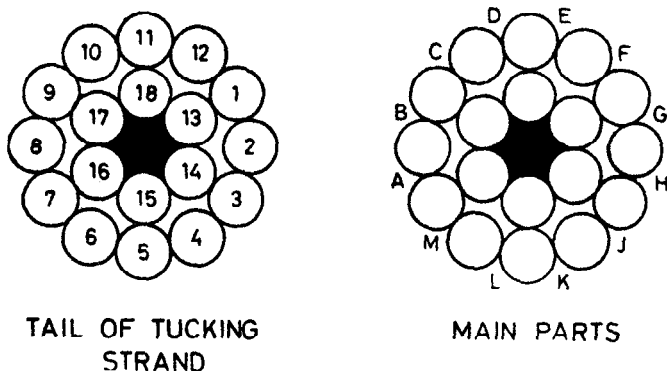


FIG. 6 TAIL AND MAIN WIRE ROPE FOR NON-ROTATING ROPE OF 18×7 CONSTRUCTION

E-2.2 The first series of tuck shall be as given below:

Group No.	Tail No.	In at	Out at	Direction
Two	3, 4, 15	A	E	Clockwise
One	1, 2, 14	A	C	Clockwise
Three	5, 6, 16	A	G	Anti-clockwise
Four	7, 8, 17	A	J	Anti-clockwise
Five	9, 10, 18	A	L	Anti-clockwise
Six	11, 12, 13	C	A	Anti-clockwise

E-2.3 For ropes having a wire strand core, the core shall be grouped with tails, No. 11, No. 12 and No. 13, that is, group six. The remaining tucks shall be same as in the case of wire rope of 17×7 construction.

E-3. NON-ROTATING SPLICE FOR 34×7 CONSTRUCTION

E-3.1 The tucks shall be made under the outer strands only of the main part of the rope. The inner strands of inner rope shall not be pierced with a spike or disturbed in any way. Length of the tails for tucking shall be at least 60 times the diameter of the rope (see Fig. 7).

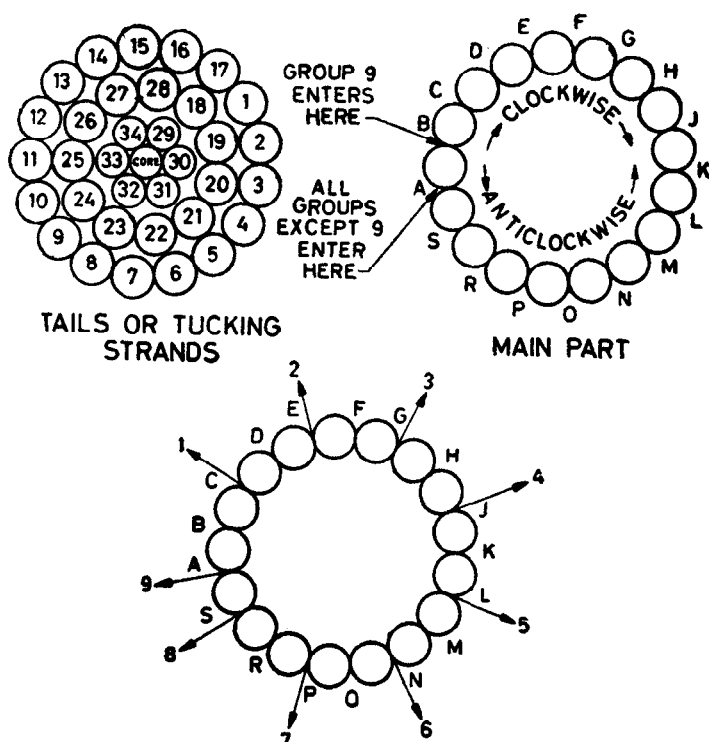


FIG. 7 NON-ROTATING SPLICE FOR WIRE ROPES OF 34 x 7 CONSTRUCTION

E-3.2 The first series of tucks shall be as given below:

Group No.	Tail No.	In at	Out at	Direction
Three	5, 6, 22, 29	A	G	Clockwise
Two	3, 4, 20, 21	A	E	Clockwise
One	1, 2, 18, 19	A	C	Clockwise
Four	7, 8, 23, 30	A	J	Anti-clockwise
Five	9, 10, 24, 31	A	L	Anti-clockwise
Six	11, 12, 25, 32	A	N	Anti-clockwise
Seven	13, 14, 26, 33	A	P	Anti-clockwise
Eight	15, 27, 34	A	S	Anti-clockwise
Nine	16, 17, 28	B	A	Anti-clockwise

E-3.3 The second, third, fourth and fifth series of tucks shall be as given below:

Group No.	Second Series		Third Series		Fourth Series		Fifth Series	
	In at	Out at	In at	Out at	In at	Out at	In at	Out at
One	E	G	J	L	N	P	S	B
Two	G	J	L	N	P	S	B	C
Three	J	L	N	P	S	B	C	E
Four	L	N	P	S	B	C	E	G
Five	N	P	S	B	C	E	G	J
Six	P	S	B	C	E	G	J	L
Seven	S	B	C	E	G	J	L	N
Eight	B	C	E	G	J	L	N	P
Nine	C	E	G	J	L	N	P	S

E-3.4 After completion of the fifth series, one tail from each group shall be removed except in groups eight and nine, to provide nine groups each with three tails. For sixth and seventh series the method of operation is same as before; one tail from each group shall be removed.

E-3.5 Eighth and Ninth Series — This series of tucks shall be done on the same principle as before. Broken off ends shall be hammered up and served over.

APPENDIX F

(Clause 3.6)

METHODS FOR LONG EYE AND THIMBLE SPLICE FOR STRANDED ROPES

F-1. FIVE-TUCK SPLICE

F-1.1 Proper method of splicing shall be followed so as to ensure that after the first series of tucks, the tucking strands or tails shall emerge from the main part of rope in their correct positions. In case of a six stranded rope, one tucking strand shall emerge from each interstice, or gusset of the main part.

F-1.2 The wire ropes shall be prepared in the following way before splicing is done.

F-1.2.1 The rope shall be measured and marked where it has to form the centre of the crown of the eye making due allowance for the loss in the straight length caused by the curving of the rope for making a loop.

F-1.2.2 The rope shall be fixed in a vice and bent to form a loop so that the mark comes at the crown part of the loop, the length of the short end of the rope left protruding shall not be less than 32 times the diameter of the rope.

F-1.2.3 The two parts of the rope shall be forced close together at the loop points and rope shall be marked where the short end leaves the loop points.

F-1.2.4 These two parts shall be firmly seized together with strong wire so that they are in direct contact. This seizing shall only consist of two or three turns of wire.

F-1.3 During the preparation and prior to making the tucks, no strand should be removed from the wire rope.

F-1.4 The loop shall be placed in the vice with the rope leading vertical and the short end on the left hand side.

F-1.5 The end bindings shall be removed and short end of the rope shall be unlaid to provide the tails for splicing.

F-1.6 The fibre main core shall be tucked into the main part together with tail No. 1 during the first tuck and the core shall then be cut off where it emerges from the main part.

F-1.7 In the case of the wire ropes with wire cores, the wire core shall never be cut from the rope. This shall be split up and wire or strands shall be distributed among the tucking tails, and shall be tucked with them for at least 3 tucks.

F-1.8 When the rope is not preformed the ends of each tail shall be bound separately.

F-1.9 The first three series of tucks shall be as shown below (see Fig. 8 and Fig. 9).

<i>First Series of Tucks</i>			<i>Second Series of Tucks</i>			<i>Third Series of Tucks</i>		
Tail No.	In at	Out at	Tail No.	In at	Out at	Tail No.	In at	Out at
1	B	A	1	B	C	1	D	E
6	C	B	6	C	D	6	E	F
2	B	C	2	D	E	2	F	A
3	C	D	3	E	F	3	A	B
5	D	F	4	F	A	4	B	C
4	D	E	5	A	B	5	C	D

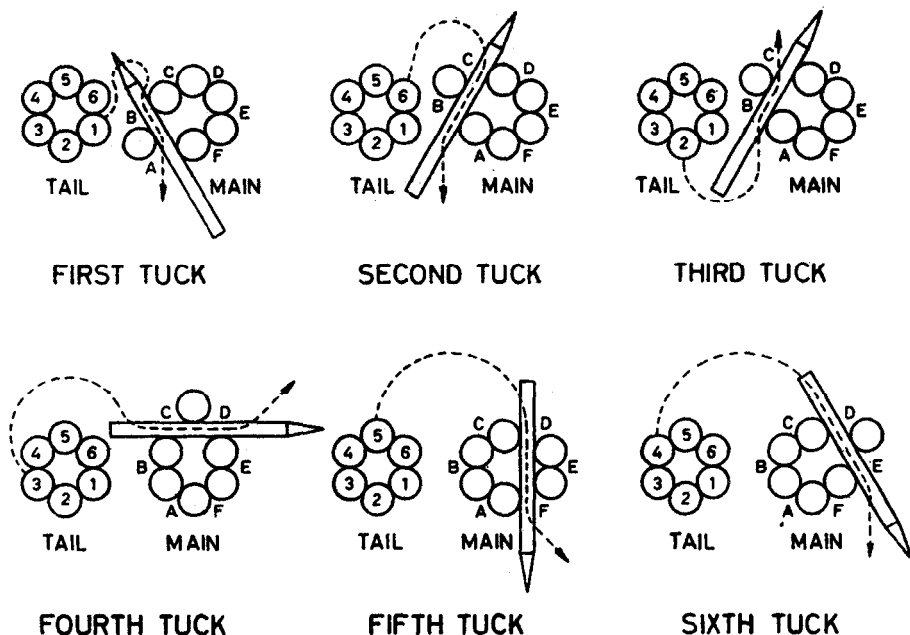


FIG. 8 FIRST SERIES OF TUCKS

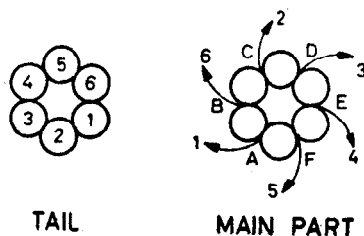


FIG. 9 DIAGRAM SHOWING THE EMERGENCE OF TAILS AFTER THE FIRST SERIES IS COMPLETED

F-1.10 After the third series, the wires of a wire main core may be broken off, and the number of wires in each of the main tails shall be reduced to half of the original number, preferably by breaking off. The remaining wires shall be twisted up to a rough strand formation, and at the same time the cut ends shall be enclosed in the centre.

F-1.11 The fourth and fifth series of tucks shall be as shown below:

<i>Fourth Series of Tucks</i>			<i>Fifth Series of Tucks</i>		
Tail No.	In at	Out at	Tail No.	In at	Out at
1	<i>F</i>	<i>A</i>	1	<i>B</i>	<i>C</i>
6	<i>A</i>	<i>B</i>	6	<i>C</i>	<i>D</i>
2	<i>B</i>	<i>C</i>	2	<i>D</i>	<i>E</i>
3	<i>C</i>	<i>D</i>	3	<i>E</i>	<i>F</i>
4	<i>D</i>	<i>E</i>	4	<i>F</i>	<i>A</i>
5	<i>E</i>	<i>F</i>	5	<i>A</i>	<i>B</i>

F-1.12 The splice shall be removed and the taper shall be hammered down, starting from the eye end and working down the taper, so as to tighten up the tucks and to round up the taper. The protruding wire ends shall be removed preferably by 'breaking off', and again rounded up over the broken-off ends. The taper (or at least that portion containing the wire ends of the tails) shall be served with spun yarn or wire strand to give protection to the user when handling.

F-1.13 The tails should be pulled down in line with the centre line of the loop. To get the tuck tight and short, it should be beaten by means of a mallet or hammer, so as to get the tuck as nearly as possible at right angles to the axis of the rope. The hammering should start on the position of the tails before its entry into the rope, and shall be continued on the tuck itself.

F-1.14 Instead of loop, when thimble has to be spliced, the method for splicing shall be as given below.

F-1.14.1 The thimble shall be placed with its crown on the mark made on the wire (see **F-1.2.1**) and short end of the rope shall be bent around in the groove of thimble, the short end of the rope shall be left protruding therefrom, and this will provide the length for tucking tail. This length shall be not less than 32 times the diameter of the rope.

F-1.14.2 The two parts of the rope shall be forced close together at the thimble points, and where the short end leaves the thimble points the rope shall be marked *B*.

F-1.14.3 Where the short end is longer than is necessary for the tails, the required length shall be measured and marked *C*. The thimble shall be removed. The rope shall be bound firmly at mark *B* with a fine fibre, working away from the short end for a distance equal to two-and-a-half times the diameter of the rope. When necessary, cutting bindings shall be put on each side of mark *C* and rope shall be cut off.

F-1.14.4 The thimble shall be re-assembled at its appropriate position, the rope shall be bent around and the two parts of rope forced together at the points of the thimble. These two parts shall be firmly seized together with strong wire so that they are in direct contact. This seizing shall only consist of two or three turns of wires.

F-1.14.5 The rope and thimble shall be tightly bound together at the crown of the thimble and again on each flank, serving towards the point of the thimble and as close as possible thereto so that the rope is in solid contact with the groove of the thimble and that the two parts of the rope are together at the crutch (*see Fig. 10*).

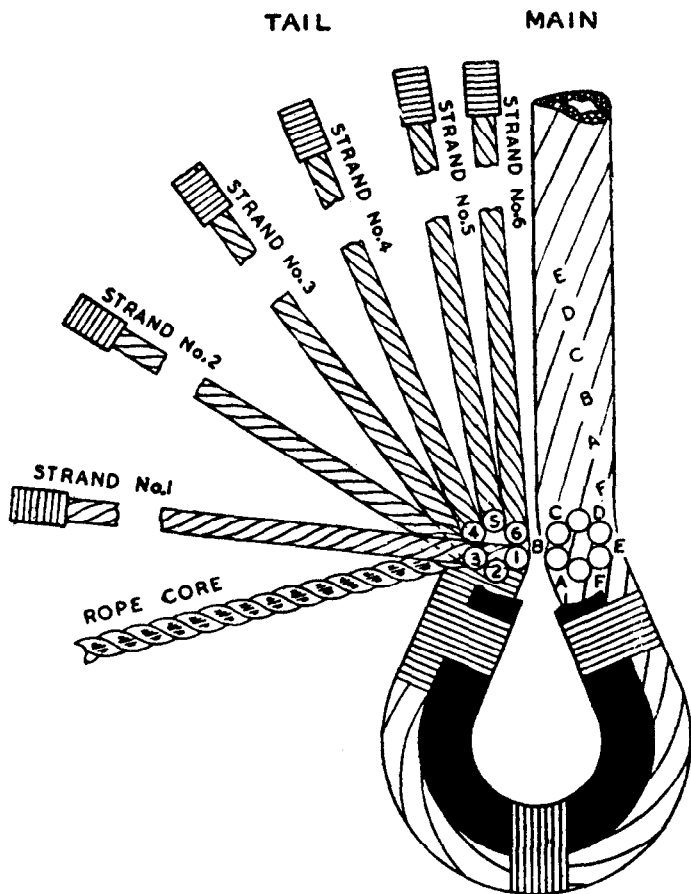


FIG. 10 PREPARATION FOR THIMBLE SPLICE (SIX-STRANDED ROPE)

F-1.14.6 Tucking procedure in case of fitting a thimble at the end shall be same as for making the plain loop (*see* Appendix E).

F-2. ALTERNATIVE METHODS

F-2.1 One of the alternative methods of splicing is to have the first series of tucks as given below (*see* Fig. 11). The fibre main core shall be tucked into the main parts together with the tail No. 2 for the first tack and core shall then be cut off. The other series of tucks shall be as given in **F-1**.

<i>First Series</i>		
Tail No.	In at	Out at
1	<i>B</i>	<i>D</i>
2	<i>B</i>	<i>E</i>
3	<i>B</i>	<i>F</i>
4	<i>B</i>	<i>A</i>
5	<i>C</i>	<i>B</i>
6	<i>D</i>	<i>C</i>

F-2.2 Another method of splicing is to have the first series of tuck as given below. The other series of tucks shall be as given in **F-2.1**.

<i>First Series</i>		
Tail No.	In at	Out at
1	<i>A</i>	<i>B</i>
2	<i>A</i>	<i>C</i>
3	<i>A</i>	<i>D</i>
4	<i>A</i>	<i>E</i>
5	<i>A</i>	<i>F</i>
6	<i>B</i>	<i>A</i>

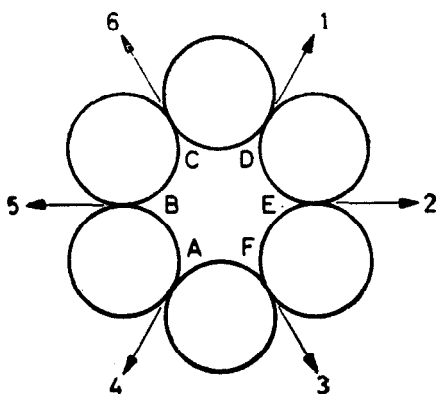


FIG. 11 DIAGRAM SHOWING THE EMERGENCE OF TAILS AFTER THE FIRST SERIES IS COMPLETED

F-3. FOUR-AND-A-HALF-TUCK SPLICINGS

F-3.1 The preparation of the rope shall be done in the similar manner as already described in case of five-tuck splice. The first, second and third series of tucks shall also be done in the same manner as specified in the case of five-tuck splice. In the fourth series of tucks, the strand ends shall be tucked as usual without cutting the half number of wires, which is being done in case of five-tuck splice.

F-3.2 The half-tuck shall be done by passing the alternate strands over the adjacent rope strands and under the following two strands going against the lay of the rope.

F-3.3 After the splicing is complete, it shall be hammered and served in the same manner as described in case of five-tuck splice.

A P P E N D I X G

(Clause 3.7)

ENDLESS ROPE

G-1. BUTT SPLICE

G-1.1 The two ends of the rope shall be joined together by two five-tuck splices.

G-2. NUMBER OF TUCKS

G-2.1 The splices shall be tucked three times with the full size of the strand, a fourth time with the strands each reduced to half the original number and a fifth time with the strands each further reduced to one third the original number. The heart strand is to be rowed in during tucking so that a double heart is produced for at least the length of the first three tucks in both directions.

G-3. METHOD OF TUCKING

G-3.1 The tucks of the splice shall be made over one strand and under one strand against the lay of the rope. The heart strand of the rope shall not be removed when the strands are opened out for tucking, but may be cut to a suitable length.

G-3.2 First Three Tucks — After marrying the rope so that the two heart strands emerge at opposite sides, the first tuck is to be made as follows.

G-3.2.1 The spike shall be inserted in the stranding rope immediately to the left of the heart strand of the rope being tucked. The strand next on the right of the heart strand shall then be tucked through, the heart strand being forced in as the spike is rowed. Then the strand to the left of the heart strand shall be tucked and so on, working round from right to left completing the tuck. After a tuck has been completed, the strands should be hove well home, so that a neat lay of tuck without kinks is formed. The tuck shall be beaten down and a good whipping shall be put on to prevent back spring of the strands whilst making the next tuck. The second and the third tucks are to be made in the same manner as the first tuck.

G-3.3 Fourth Tuck—The wires in each tucking strand shall be reduced to half of the original number of wires. Any length of heart strand remaining outside the stranding rope shall now be cut off and the end rowed in as before. Tucking shall then proceed up to the first three tucks.

G-3.4 Fifth Tuck—Wires in the tucking strands are again reduced to half of the numbers which they had after fourth tuck. These shall then be finally tucked, over one and under one, and the tuck shall be beaten down, as in the previous tucks.

G-4. FINISHING OF THE SPLICE

G-4.1 On completion of tucking, the rope shall be stretched and the ends of all wires, including those which have to be laid back and stopped down, shall be broken off close in the nip of the lay of the rope by twisting.

G-5. FINISHING

G-5.1 The ends of the splice in way of the twisted-off ends of wire, that is, between the end and the third tuck, shall be tightly served with seizing wire, after parcelling with canvas, hessian or wax paper.

APPENDIX H

(Clause 3.8)

GROMMET

H-1. A grommet consists of an endless rope having 6/1 construction and is used where high ultimate breaking strength of the rope is required beyond the limits of a single part rope.

H-2. A strand of sufficient length to complete the grommet shall be obtained by either of the following methods:

Method A—An outer strand shall be unlaid from a specimen of 6/1 rope conforming to the requirements of the customer.

Method B—Unlaying from a specimen of 6/4 rope having strands in all respects equivalent to that obtained by method A above.

Method C—Using a virgin strand either preformed or post-formed and in all other respects equivalent to those obtained by Methods A and B above.

H-3. During the course of construction of the grommet the preformed lay of the strand shall be maintained and shall not be interfered with, except when laying in the core, for which purpose lengths of strand left to form the core should be straightened.

H-4. The length of the strand required to form a grommet shall be equal to about seven-and-a-half times the perimeter of the grommet. If the bearing length and the sizes of the eye at each end of the grommet are known, then the perimeter of the grommet shall be calculated as follows (see Fig. 12):

$$\begin{aligned}\text{Perimeter of grommet} &= (2 \times X) + (2\frac{1}{2} \times Y) + (2\frac{1}{2} \times Z) \\ &= 2X + 2.5 (Y + Z)\end{aligned}$$

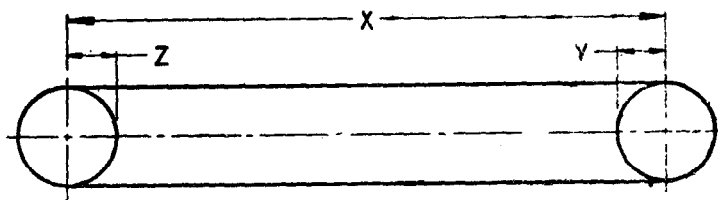


FIG. 12 PERIMETER OF GROMMET

H-5. To form a grommet, the appropriate length of the strand shall be taken and its two ends shall be tightly secured with flax. The whole length of the strand shall be formed into a coil so that it is easy to handle.

H-6. Depending upon the size of the grommet, a circular ring of a rod or strand (of band wires) equal to the diameter of strand required for the grommet shall be taken. One of the ends of the strand shall be tied securely with flax at any point on the circular ring. The strand shall then

be turned round and round about the circular ring in proper direction, care being taken to see that the torsion of the strand is taken out after each turn and the strand shall be tightly laid. This operation is repeated till the strand is wound six times round the ring and the starting point is reached. At this point, the rod shall be lifted and cut. Then the rod shall be removed from one side and its place shall be gradually occupied by the starting end of the strand. Similarly, the other half of the rod shall also be removed, and its place shall be gradually occupied by the finishing end of the strand. The finishing end of the strand shall then be cut off in such a way that there shall be a gap of about 6 mm between the starting and the finishing ends.

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